

## ARYL SULFATASE ACTIVITY IN HUMAN FETAL SKIN

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**Abstract.** We have determined the arylsulfatase activity in crude skin homogenates of human embryos, 1 to 5 months old. The enzyme assay was performed according to Smith and nitrocatecholsulfate served as a substrate. During fetal development there is a permanent increase of arylsulfatase activity from the first to the fifth fetal month. There appears to be a relationship between the arylsulfatase activity and the differentiation of the epidermis. A total of 51 determinations were made, 7 of them before 7.5 weeks; 26 from 7.5 to 11.5 weeks; 14 from 11.5 to 15.5 weeks, and 4 from 15.5 to 22 weeks, with the average value of 0.99, 2.22, 2.95 and 3.68 micrograms of liberated nitrocatechol/gww/1 min.

Nitrocatecholsulfatase is the enzyme from the group of arylsulfatases which cleaves the esters of sulphuric acid and some aromatic compounds (7). The subject of this study is an arylsulfatase of the second (II) type which *in vitro* cleaves the potassium salt of nitrocatecholsulfate. The enzyme activity of arylsulfatases was determined in various biological material (5), human organs included (2, 8). Arylsulfatase has been found in the blood serum (3) and in urine (1). Arylsulfatase, type C, has been found in the skin (11). By histochemical methods, the enzyme was determined in the skin with parakeratotic keratinization (4, 9).

In this paper we wished to study the relationship between the development of the human skin and the arylsulfatase activity.

## MATERIALS AND METHODS

Nitrocatecholsulfate served as a substrate for arylsulfatase activity. The enzyme assay was performed according to Smith (10). The determination of arylsulfatase activity was made in crude homogenates of the skin. The skin was obtained from healthy fetuses from healthy

women after legal abortion for social and medical reasons. The age of the fetus was determined from data obtained from the mother (last menses, date of conception) and from inspecting the fetus using criteria of Potter (6). Most fetuses were obtained by the vaginal route. Four or six minutes elapsed between the start of anesthesia and the isolation of the skin, which was immediately placed in an ice-cold dish.

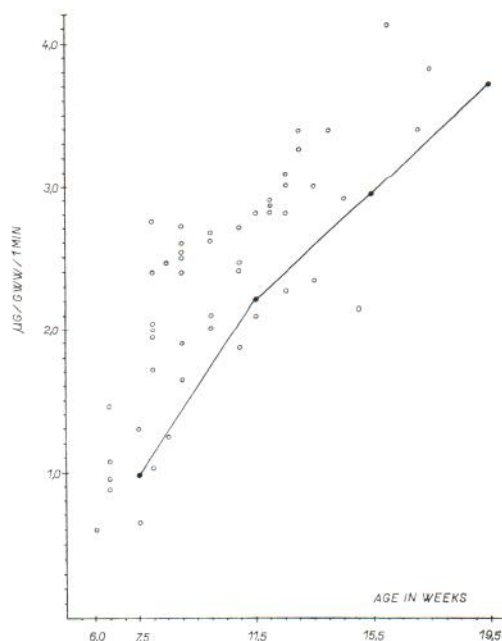


Fig. 1. Arylsulfatase activity in crude skin homogenates.  $\circ$ , individual values. For statistical evaluation fetuses were grouped according to age. In the first group are fetuses until 7.5 weeks (A); in the second group from 7.5 to 11.5 weeks (B); in the third group from 11.5 to 15.5 weeks (C), and in the fourth group from 15.5 to 22 weeks (D) of postconceptional age.  $\bullet$ , mean values of the age groups. Statistical evaluation: group A is significant against B, C, D for  $p < 0.01$ . Group B against C and D and group C against D for  $p < 0.01$ .

The skin of the back (regio interscapularis) was carefully prepared and weighed on a torsion balance to  $\pm 2$  mg. A part of the skin was used for histological examination and immediately put into 10% Baker solution. The skin was homogenized for 30 sec in ice-cold bi-distilled water with a Potter-Elvehjem homogenizer having a teflon pestle. According to the expected activity, homogenates were diluted to give a linear course of the reaction and a linear relationship between the rate of substrate breakdown and enzyme concentration. Activity is expressed in micrograms of substrate released during 1 min/gww at 37°C. The duration of incubation was 180 min. In the evaluation of results, the *t*-test was used.

## RESULTS

The results are shown in Fig. 1. The activity of arylsulfatase increases during the period studied. The histological examination of the fetal skin confirmed the differentiation of the epidermis in this period.

## DISCUSSION

There appears to be a correlation in time between the differentiation of the epidermis in fetal skin and the activity of arylsulfatase. Since this study deals with material from the back of the fetus we do not know whether this conclusion is also valid for the skin in other body regions.

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